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17. (Amended) The method of claim 15 wherein selecting an estimated color for each pixel of the first group includes, for each pixel of the first group, computing a sum of a correction term and a color code of the pixel, the correction term being equal to an error value computed for a previous single one of the pixels of the digital image multiplied by the first correction coefficient, the selected estimated color for the pixel being the estimated color that most closely matches the computed sum.

REMARKS

This amendment is being filed in response to the Office Action having a mailing date of December 19, 2002. Claims 1, 5, 8, 15, and 17 are amended as shown. More specifically, independent claims 1, 8, and 15 are amended to more concisely recite certain distinctive features. No new matter has been added. With this amendment, claims 1-20 remain pending in the application.

In the Office Action, claims 8, 9, and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Shiau (U.S. Patent No. 5,353,127). Claims 1 and 5-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Shiau and Yamada (U.S. Patent No. 6,172,768). Claims 15-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Shiau and Itoh (U.S. Patent No. 4,982,292). The various other dependent claims were rejected based on the references cited in the Office Action. For the reasons set forth below, the applicants respectfully request the Examiner to reconsider and to withdraw the rejections.

A disclosed embodiment of the invention will now be discussed in comparison to the applied references. Of course, the discussion of the disclosed embodiment, and the discussion of the differences between the disclosed embodiment and subject matter described in the applied references, do not define the scope or interpretation of any of the claims. Instead, such discussed differences are intended to merely help the Examiner appreciate important claim distinctions discussed thereafter.

One embodiment of the present invention provides a method of approximation of the respective colors of pixels of a digital image by selecting, from a lookup table and

successively for each pixel of the image, a color, the code of which comes close with the smallest error to the sum of the code of the current pixel color and of a correction term. The correction term in one embodiment is equal to the smallest error calculated upon approximation of the preceding pixel, assigned with a weighting coefficient that depends on the position of the current pixel in the image.

As mentioned above, a feature of an embodiment is that the color of a current pixel is corrected with a correction term that depends only on one neighboring pixel (*e.g.*, the preceding pixel in the same line). This feature is described by way of example in Figure 5 and on page 7, lines 7-9 of the present application. Furthermore, the correction term is calculated with a variable weighting coefficient that depends on the position of the current pixel in the image. In one embodiment (such as covered by dependent claims 3 and 4), the weighting coefficient is given one value among four according to the parity of the least significant bit of the X and Y coordinates of the current pixel.

In contrast, Shiau and Yamada both disclose a method and apparatus that is different than what the applicants have disclosed. Both Shiau and Yamada use at least four neighboring pixels forming a weighting raster (see *e.g.*, Figure 3A of Shiau and Figures 6A-6C of Yamada), which corresponds to the prior art illustrated in Figure 4 of the present application. In other words, neither of these references disclose, teach, or suggest use of a technique that uses a correction term for a current pixel that is based on a single one of the neighboring pixels.

Furthermore, Shiau uses a weighting coefficient with fixed values (rather than variable values) that do not depend on the position of the current pixel, but rather on the position of the source pixel in the weighting raster. See *e.g.*, column 3, lines 27-28 and lines 57-58 of Shiau. Yamada discloses use of weighting coefficients that depend on accumulated output error, or on image source data and accumulated output error, but not on the position of the current pixel in the image. See *e.g.*, column 2, lines 24-27 of Yamada.

Claim 1 is directed towards a method of approximation of the respective colors of pixels in a digital image. Claim 1 in its present form is believed to be allowable over both Shiau and Yamada, since the claim recites "approximation of a preceding pixel" and "a weighting coefficient depending on the position of the current pixel in the image." As described above, both Shiau and Yamada disclose techniques that approximate based on at least four neighboring

pixels, rather than a single individual preceding pixel. Also, these references use weighting coefficients that depend on parameters other than a position of the current pixel in the image.

However, to facilitate prosecution, independent claim 1 is nevertheless amended to clarify that the correction term is based on approximation of <u>one</u> preceding pixel. This amendment clarifies that only a single individual preceding pixel is used in the approximation, which is in sharp contrast to the cited references. Therefore, amended claim 1 is now further allowable over the references.

Independent claim 18 is directed towards a method of compressing a digital image having pixels each with a color represented by a color code. Independent claim 8 in its present form is allowable over Shiau because it recites that "one of a plurality of weighting coefficients is based on a position of the current pixel." Furthermore, claim 8 recites that the correction term is equal to an error value computed for "a previous one of the pixels multiplied by the selected weighting coefficient for the current pixel." These features are not disclosed, taught, or suggested by Shiau, and therefore claim 8 allowable over that reference. However, and once again to facilitate prosecution, independent claim 8 is nevertheless amended to recite that the correction term is equal to an error value computed for a "previous <u>single</u> one of the pixels." This amendment clarifies that the correction term is derived from a single one of a previous pixel, rather than multiple pixels as disclosed in Shiau. Accordingly, amended claim 8 is now further allowable.

Independent claim 15 is directed towards a method of compressing a digital image having pixels each with a color represented by a color code. Claim 15 is amended to recite that the first and second correction coefficients are variable. This feature is not found in Shiau, since Shiau discloses a system where the weighting coefficients are <u>fixed values</u> that are based on the position of the source pixel in the weighting raster. Furthermore, claim 15 is also amended to recite that the first and second correction coefficients are based on a position of their corresponding pixels. This additional amendment clarifies the variable nature of the first and second correction coefficients, since the correction coefficients change from one current pixel position to another. Again, these features are not found in Shiau, since Shiau uses a technique where the weighting coefficients have fixed values that are based on the position of the source pixel in the weighting raster. Therefore, claim 15 is allowable over Shiau.

Adding the reference of Itoh to Shiau does not cure the deficiencies of Shiau. Itoh is directed towards a method and apparatus for processing pel signals of an image, and does not disclose, teach, or suggest use of variable correction coefficients that are based on a position of their corresponding pixels.

Independent claim 1 and its dependent claim 5 are also amended to provide proper antecedent basis. A similar minor amendment is also made to independent claim 8. Dependent claim 17 is amended to clarify that this claim does not fall within 35 U.S.C. § 112, sixth paragraph. Dependent claim 17 is also further amended to more clearly recite the distinctive feature of the correction term being equal to an error value computed for a previous <u>single</u> one of the pixels of the digital image. The certified copy of the priority document is included with this amendment.

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 622-4900.

The Commissioner is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version With Markings to Show Changes Made.**"

Based upon the above remarks, applicants respectfully request favorable reconsideration of this application and its early allowance.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1, 5, 8, 15 and 17 have been amended

1. (Amended) A method of approximation of respective colors of pixels of a digital image, the method comprising selecting, from a look-up table and successively for each pixel, a color having a code which comes close with ~~the~~ a smallest error to ~~the~~ a sum of ~~the~~ a code of a current pixel's color and of a correction term, wherein the correction term is equal to the smallest error calculated upon approximation of ~~a~~ one preceding pixel, assigned with a weighting coefficient depending on ~~the~~ a position of the current pixel in the image.

5. (Amended) The method of claim 1, wherein the image is scanned line by line, and the correction term is null for ~~the~~ a first pixel of each line.

8. (Amended) A method of compressing a digital image having pixels each with a color represented by a color code, the method comprising:

selecting, for a current one of the pixels of the digital image, one of a plurality of weighting coefficients based on a position of the current pixel;

computing a sum of a correction term and a color code of the current pixel, the correction term being equal to an error value computed for a previous single one of the pixels multiplied by the selected weighting coefficient for the current pixel;

selecting for the current pixel an estimated color from a plurality of estimated colors, the selected estimated color being ~~the~~ an estimated color that most closely matches the computed sum; and

replacing the color code of the current pixel with the selected estimated color.

15. (Amended) A method of compressing a digital image having pixels each with a color represented by a color code, the method comprising:

assigning a first variable correction coefficient to each pixel of a first group of pixels in the digital image, the first correction coefficient being based on a position of its corresponding pixel;

assigning a variable second correction coefficient to each pixel of a second group of pixels in the digital image, the second correction coefficient being based on a position of its corresponding pixel;

for each of the pixels of the first group, selecting an estimated color of a plurality of estimated colors, the selected estimated color being selected based on the color of the pixel and the first correction coefficient; and

for each of the pixels of the second group, selecting an estimated color of the plurality of estimated colors, the selected estimated color for the pixel being selected based on the color of the pixel and the second correction coefficient.

17. (Amended) The method of claim 15 wherein ~~the step of~~ selecting an estimated color for each pixel of the first group includes, for each pixel of the first group, computing a sum of a correction term and a color code of the pixel, the correction term being equal to an error value computed for a previous single one of the pixels of the digital image multiplied by the first correction coefficient~~;~~, the selected estimated color for the pixel being the estimated color that most closely matches the computed sum.